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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/649,676   | 08/28/2003  | Wen-Chang Chen       | CHEN3583/EM         | 5669             |
| 23364  | 7590        | 07/12/2004           | EXAMINER            |                  |
| BACON & THOMAS, PLLC<br>625 SLATERS LANE<br>FOURTH FLOOR<br>ALEXANDRIA, VA 22314 |             |                      | MARKHAM, WESLEY D   |                  |
|  |             |                      | ART UNIT            | PAPER NUMBER     |
|  |             |                      | 1762                |                  |
| DATE MAILED: 07/12/2004  |             |                      |                     |                  |

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                        |                     |
|------------------------------|------------------------|---------------------|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |
|                              | 10/649,676             | CHEN ET AL.         |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |
|                              | Wesley D Markham       | 1762                |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTH(S) FROM  
 THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) This action is **FINAL**.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) 2-9 and 11 is/are allowed.
- 6) Claim(s) \_\_\_\_\_ is/are rejected.
- 7) Claim(s) 1 and 10 is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 28 August 2003 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                     | Paper No(s)/Mail Date. _____ .  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|  | 6) <input type="checkbox"/> Other: _____ .                                  |

### **DETAILED ACTION / EX PARTE QUAYLE**

Claims 1 – 11 are currently pending in U.S. Application Serial No. 10/649,676, and an Office Action on the merits follows.

#### ***Drawings***

1. The formal drawings (6 sheets, 6 figures) filed by the applicant on 8/28/2003 are acknowledged and approved by the examiner.

#### ***Ex parte Quayle***

2. This application is in condition for allowance except for the following formal matters:

#### ***Oath/Declaration***

3. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02. The oath or declaration is defective because the specification to which the oath or declaration is directed has not been adequately identified. See MPEP § 601.01(a). Specifically, the box () indicating that the specification (to which the declaration is directed) was either (1) attached thereto or (2) filed on a given date as a given application number is not checked. As such, the specification is not adequately identified.

***Specification***

4. Applicant is reminded of the proper language and format for an abstract of the disclosure. The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. Additionally, the abstract is objected to because the phrase "...the material has excellent transparency and plateness..." (lines 8 – 9) is unclear (i.e., as to what the "plateness" of a material refers to). Further, the last sentence of the abstract appears to contain typographical and/or grammatical errors, and the applicant is suggested to amend such sentence to read, "When an optical waveguide component is prepared from the composite, the reduction of a near-infrared ray is less than 0.7 dB/cm, and therefore the waveguide component is advantageous for use as an optical communication element." Appropriate correction (e.g., as discussed above) is required.
5. The disclosure is objected to because of the following informalities:
  - Page 1, line 18: The word "dopanted" is a typographical error and should read "doped".
  - Page 2, lines 9 and 13: The words "florinated" and "flourinated" are typographical errors and should read "fluorinated".
  - Page 2, lines 19 and 20: The phrase "reflective index" is a typographical error and should read "refractive index".
  - Page 2, line 26: The word "currently" is a typographical error and should read "current".

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- Page 4, line 21: The phrase “reflective index” is a typographical error and should read “refractive index”.
- Page 4, line 26: The word “produced” is a typographical error and should read “produce”.

Appropriate correction as discussed above is required.

### ***Claim Objections***

6. Claims 1 and 10 are objected to because of the following informalities:

- Claim 1, line 13: The phrase “reflective index” is a typographical error and should read “refractive index”.
- Claim 1, line 17: The word “produced” is a typographical error and should read “produce”.
- Claim 10, line 1: The phrase, “wherein the steps (a) and (d) is carried out...” contains a typographical error and should read, “wherein the steps (a) and (d) are carried out...”

Appropriate correction is required.

### ***Allowable Subject Matter***

7. Claims 1 and 10 contain allowable subject matter but have been objected to for the reasons set forth above in paragraph 6. Claims 2 – 9 and 11 are allowed.

8. The following is a statement of reasons for the indication of allowable subject matter.  
The claimed process, as represented by independent Claim 1 (from which Claims 2

–11 depend), is drawn to preparing an optical waveguide from an acrylate / titanium alkoxide composite material. The process comprises forming a specific precursor solution by reacting an acrylate with titanium alkoxide in the presence of a silicon coupling agent and water by an acid-free sol-gel method, coating such solution on a silicon dioxide-coated silicon chip and evaporating the solvent at a specific temperature to form a composite film, using lithography to form a channel on the resulting film, repeating the step of forming the precursor solution while using a different ratio of acrylate and titanium alkoxide in order to form a solution having a refractive index less than that of the solution obtained from the step above, and applying the lower refractive index solution onto the film having the channel(s), evaporating the solvent, and then baking to produce the acrylate / titanium alkoxide composite optical waveguide component.

9. The closest prior art of record is discussed below. Dawes et al. (USPN 6,144,795) teaches a process of forming a hybrid organic-inorganic optical waveguide device but does not teach or reasonably suggest using the applicant's claimed precursor solution (e.g., the material of Dawes et al. lacks an acrylate component) or using lithography to form a channel in the deposited film. Kuramoto et al. (US 2003/0228120 A1) teaches a process of forming a hybrid organic-inorganic optical waveguide but does not teach or reasonably suggest using the applicant's claimed precursor solution (e.g., the material of Kuramoto et al. lacks a silicon coupling agent) or process (e.g., using lithography to form a channel on the resulting film, and repeating the step of forming the precursor solution while using a different ratio of

acrylate and titanium alkoxide in order to form a solution having a refractive index less than that of the solution obtained from the first step, and applying the lower refractive index solution onto the film having the channel(s)). Etienne (US 2004/0071426 A1) teaches forming a hybrid organic-inorganic waveguide but lacks a teaching of the claimed precursor composition (e.g., a titanium alkoxide) or method (e.g., forming a channel using lithography, repeating the deposition with a precursor solution that has a different ratio of acrylate and titanium alkoxide, etc.). The organic / inorganic hybrid composition taught by Su et al. (USPN 6,492,540 B1) does not contain a silicon coupling agent, and there is no teaching or suggestion in Su et al. to perform the applicant's claimed process steps. The metal alkoxide polymers taught by Zha (US 2003/0195321 A1) are formed by acidolysis (i.e., not an acid-free sol-gel method), and Zha does not teach the claimed process steps (e.g., repeating the deposition with a precursor solution that has a different ratio of acrylate and titanium alkoxide). The organic-inorganic composite material of Kuramoto et al.(2) (US 2003/0165710 A1) is different from the applicant's claimed precursor solution and is not formed by an acid-free sol-gel method. Further, Kuramoto et al.(2) does not teach or reasonably suggest forming a channel using lithography in the context of the applicant's claims. Rantala (US 2004/0008960 A1) teaches forming an organic-inorganic hybrid material optical waveguide by depositing the hybrid material onto a substrate, patterning the deposited material (i.e., forming channels) to form a core, and then depositing a hybrid material having a different ratio of components over the previously patterned film to form a cladding. However, the precursor

material taught by Rantala is significantly different from the applicant's claimed precursor solution (i.e., a solution prepared by reacting an acrylate with titanium alkoxide in the presence of a silicon coupling agent and water by an acid-free sol-gel method), and there is no teaching or suggestion in the prior art to use a precursor solution prepared in the manner claimed by the applicant in the process of Rantala. The photo-patternable perfluorinated silane sol-gel material taught by Fardad et al. (US 2004/0033309 A1) is different from the applicant's claimed precursor solution, and the process of Fardad et al. does not include repeating the deposition with a precursor solution that has a different ratio of components such as acrylate and titanium alkoxide. The composition used to produce the waveguide tunable laser of Reisfeld et al. (USPN 5,783,319) does not contain a silicon coupling agent and is not prepared by an acid-free sol-gel method. Additionally, the process used by Reisfeld et al. to produce the waveguide tunable laser is significantly different from the applicant's claimed process (e.g., there are no channel forming or repeating steps in the process of Reisfeld et al.). As such, the prior art of record does not teach or reasonably suggest each and every limitation of independent Claim 1, and this claim contains allowable subject matter. Since Claims 2 – 11 depend from Claim 1, these claims also contain allowable subject matter.

### ***Conclusion***

Prosecution on the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11, 453 O.G. 213.

A shortened statutory period for reply to this action is set to expire **TWO MONTHS** from the mailing date of this letter.

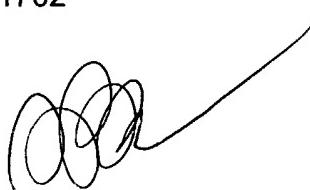
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley D Markham whose telephone number is (571) 272-1422. The examiner can normally be reached on Monday - Friday, 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Wesley D Markham  
Examiner  
Art Unit 1762

WDM



SHRIVE P. BECK  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1760